

Historic, archived document

Do not assume content reflects current scientific knowledge, policies, or practices.

184F
pg 5
cop. 5

Rev



FEEDING CATTLE FOR BEEF



Farmers' Bulletin No. 1549
U. S. DEPARTMENT OF AGRICULTURE

THE FEEDING of cattle for beef production affords one of the most practical ways of disposing of grain and roughages produced on the farm.

This industry favors diversification in agriculture and makes possible a well-balanced distribution of labor throughout the year.

Approximately 75 per cent of the fertilizing constituents of feeds fed to livestock is returned in the manure; consequently when the manure is saved and applied to the land, feeding operations largely maintain soil fertility.

Ability in buying and selling cattle and in combining feeds properly has a direct bearing on the success of beef-cattle feeding.

Quality in feeder cattle favors economical production; uniformity and quality combined invariably mean increased selling prices.

This bulletin supersedes Farmers' Bulletin 1379, Beef Production in the Cotton Belt, and Farmers' Bulletin 1382, Fattening Steers in the Corn Belt.

Washington, D. C.

Issued February 1928
Slightly revised April 1940

FEEDING CATTLE FOR BEEF

By W. H. BLACK

Senior Animal Husbandman, Animal Husbandry Division, Bureau of Animal Industry

CONTENTS

	Page		Page
Successful cattle feeding.....	1	Suggested rations.....	8
Two methods of fattening cattle.....	1	Fattening on grass.....	10
The supply of feeder cattle.....	2	Supplementary feeds for steers on grass.....	11
Selecting feeders.....	3	Feeding supplements to suckling calves.....	12
Time to buy feeders.....	4	Minerals for fattening cattle.....	13
Dry-lot feeding.....	5	Vitamins for fattening cattle.....	13
Desirable feed combinations.....	5	Feed-lot equipment.....	13
Feed required to fatten steers in dry lot.....	6		
Starting cattle on feed.....	7		

SUCCESSFUL CATTLE FEEDING

THE NET RETURNS from the feeding of cattle constitute the real basis for measuring success in the fattening of cattle for meat. A cattle feeder may be especially gifted in ability to produce large gains at a low cost, but this factor alone, when margins are rather narrow, does not necessarily insure a profitable business. In addition to being able to put large gains on cattle economically, the successful feeder should have a fair knowledge of the trends of the cattle market for a period of years. Demand for certain classes of cattle varies in different seasons. A study of cattle receipts and prices for a series of years will show that prices are higher for a specific grade at rather definite times. The price of the top grades of fat steers, for example, usually advances as the season progresses. That is, well-finished steers of exceptional quality generally sell higher in August than in June. Medium and lower grades usually reach their high point before July. Ability in buying feeder cattle and selling fat cattle at the opportune time has its foundation in knowledge of market demands at various times of the year.

TWO METHODS OF FATTENING CATTLE

There are in reality only two methods of finishing cattle for beef, namely, fattening in the dry lot and fattening on grass. Dry-lot fattening has shown its greatest development in the Middle West or Corn Belt States. This may be attributed to the fact that that area is naturally a finishing ground because of the abundance of fattening feeds produced.

Grass-fat cattle (fig. 1) have been marketed in large numbers from the ranges of the Rocky Mountain, Great Plains, and Appalachian

regions for many years, but only in very recent times has an effort been made to put a high finish on grass cattle by feeding a supplement to grass. This new practice is increasing rapidly in certain sections of the Middle West and Appalachian regions.

THE SUPPLY OF FEEDER CATTLE

The Rocky Mountain and Great Plains regions, extending from the Canadian border to the Rio Grande River on the southwestern boundary of Texas, and to the one-hundredth meridian on the east, may be considered as the area producing the bulk of feeder cattle. Some cattle, however, are finished in the feed lots of that area. This is particularly true in the sugar-beet sections of western Nebraska, eastern Colorado, and southeastern Wyoming, where cattle are fattened on sugar-beet pulp and supplemental feeds and in the semi-



FIG. 1.—Grass-fat steers in the Appalachian region

arid regions of the Southwest, where grain sorghums are grown rather extensively.

The Appalachian region produces a considerable number of feeder cattle, but most of them are sold to local feeders who finish them for market on grass. (Fig. 2.)

Although the Corn Belt States have great numbers of beef cattle, comparatively few farms there produce feeder cattle for sale. Many herds of purebred cattle are kept for the production of breeding stock. In cases where grade herds are maintained for beef, the calf crop is usually fed out by the producer and seldom changes hands. In areas in which livestock and grain farming are combined, the tendency is to crowd the calves from birth and market them as fat yearlings. A number of systems of handling calves under these conditions are being practiced. The two giving most satisfactory results are: (1) Allowing calves to run with their dams on pasture, access being given to a grain ration in a self-feeder placed within a creep; and

(2) giving calves pasture separate from their dams, access to grain in a self-feeder, and allowing them to nurse two or three times a day. Spring calves handled in this way are weaned in the fall and placed directly in the feed lot where they are fed liberally for a period of from six to eight months.

In the range areas the practice of holding steers over until they are 2 and 3 years of age is gradually giving way to the sale of the animals as feeder calves. The demand for lighter and smaller cuts of meat has brought about this change. Most of the feeders from the range areas are marketed at the large livestock markets.

SELECTING FEEDERS

In selecting feeders relative prices of various ages, weights, and grades, quality, age, uniformity, and condition are the factors to be



FIG. 2.—Good pasture is essential in the economical production of feeder cattle

carefully considered. The higher the grade or quality of the feeder the more economical will be its use of feed. The high-grade steer has greater capacity for feed and makes more economical use of it in laying on flesh in the regions of the valuable cuts. The buyer should keep this fact in mind, but should not be influenced to such a degree as always to buy the highest-priced feeders. The quantity and nature of available feeds and the length of feeding period should largely determine the age of cattle to feed. The younger the animals the longer will be the feeding period. Young cattle put their feed to three distinct uses—(1) maintenance, (2) growth, and (3) fat. All animals require a certain quantity for maintenance, but the quantity required for growth diminishes gradually with the age of the animal. As growth ceases more of the feed above that required for maintenance goes toward fat formation. Older cattle, therefore, fatten in a much shorter time.

The kind and quantity of feed should be considered in determining the age of cattle to feed. An abundance of feed makes possible a long feeding period and the feeding of younger cattle to advantage. Older cattle use roughages more advantageously, but in general young animals make more economical use of feeds.

Three or four months' difference in age means considerable difference in size with young cattle, but relatively little with the older ones. Older cattle also usually show more uniformity in finish. A uniform drove of cattle (fig. 3) is always attractive and the buyer is willing to pay more for them.

Cattle feeders usually prefer to buy thin cattle for the feed lot. However, prices of cattle and feed should be considered in this connection. When cattle are relatively cheap and feeds high, cattle possessing considerable fat are preferable. Feeders in good flesh are usually sought for short feeding periods.



FIG. 3.—Two-year-old fat steers. Note uniformity and finish

TIME TO BUY FEEDERS

Most feeder cattle are purchased early in the fall. The time of buying should be determined to some extent by the system of fattening to be followed, the quantities and kinds of feeds available, and the quality of cattle used. If the lower grades of cattle are purchased for immediate fattening in the dry lot, it is usually desirable to buy early in the fall, in order to get them marketed late in winter or early in spring. These lower grades usually reach their peak prices before June. On the other hand, steers with considerable quality and condition may sell to advantage a little later in the season.

If cattle are to be finished on grass and if there is sufficient roughage to carry them through the winter, the feeders should be purchased in the fall. Buying feeders in the spring for finishing on grass the following summer should be limited to cattle that are fairly mature. Not much finish can be expected from young grow-

ing cattle that were merely roughed through the winter and marketed off grass the following summer.

DRY-LOT FEEDING

Most of the highly finished beef comes from the dry lot and results from the conversion into meat of considerable quantities of grain fed with roughages. Corn is the standard fattening feed in the Corn Belt and in the East, while barley may be considered as such in the Northwest and Pacific Coast States, and the grain sorghums, such as milo and kafir, in the Southwest.

DESIRABLE FEED COMBINATIONS

Fattening or carbohydrate feeds should be fed in conjunction with roughages and supplemented with feeds rich in protein. In many of the fattening areas the protein supply is limited, and accordingly is one of the factors of most importance to the cattle feeder. Areas that produce legume hays which are comparatively high in protein have a decided advantage over those having only grass hay and other nonleguminous roughages, such as stover and straw. In cases where there is an abundance of legume hays, such as clover or alfalfa, and their market values are not excessive, it is perhaps unnecessary to supply any additional protein in the form of a meal or cake. However, when protein can be supplied more cheaply in the latter form, it may be advisable to replace part of the hay with a meal or cake.

Protein concentrates are used generally in rations in which straw, stovers, or silage make up the roughage. In buying a protein feed it is important to purchase the feed that will supply protein most cheaply. This can easily be determined if the percentage of protein and price per ton are known. Wheat and rice bran and the legume hays, if of good quality, will have a protein content of approximately 15 per cent, linseed meal about 35 per cent, and cottonseed meal from 36 per cent to 50 per cent. Table 1 may be used as a guide in determining the protein feed to purchase. A study of this table will show that alfalfa hay with a protein content of 15 per cent, at \$22.50 a ton will supply a pound of protein at 7½ cents. Linseed meal with a protein content of 35 per cent will supply protein at the same cost when valued at \$52.50 a ton. In case of a shortage of available roughage in the ration, it would be advisable to use the hay at \$22.50 a ton rather than the meal at \$52.50. Cottonseed meal having a protein content of 45 per cent and priced at \$45 a ton will supply protein at the same cost as a 40 per cent meal at \$40 a ton. Generally speaking, the higher grades of a certain feed are the most reasonable sources of protein.

TABLE 1.—*Cost of a pound of protein when the percentage of protein in the feed and the price per ton are known*

Price of feed per ton	Cost of 1 pound of protein when percentage of protein is—							
	15	20	25	30	35	40	45	50
	Cents	Cents	Cents	Cents	Cents	Cents	Cents	Cents
\$5.00	1.67	1.25	1.00	0.83	0.72	0.63	0.56	0.50
\$7.50	2.50	1.87	1.50	1.25	1.07	.94	.83	.75
\$10.00	3.33	2.50	2.00	1.66	1.43	1.25	1.11	1.00
\$12.50	4.17	3.13	2.50	2.08	1.79	1.56	1.39	1.25
\$15.00	5.00	3.75	3.00	2.50	2.15	1.88	1.67	1.50
\$17.50	5.83	4.37	3.50	2.91	2.50	2.19	1.94	1.75
\$20.00	6.67	5.00	4.00	3.33	2.86	2.50	2.22	2.00
\$22.50	7.50	5.63	4.50	3.75	3.21	2.81	2.50	2.25
\$25.00	8.33	6.25	5.00	4.16	3.57	3.12	2.78	2.50
\$27.50	9.17	6.87	5.50	4.58	3.93	3.43	3.05	2.75
\$30.00	10.00	7.50	6.00	5.00	4.29	3.76	3.33	3.00
\$32.50	10.83	8.12	6.50	5.41	4.64	4.06	3.61	3.25
\$35.00	11.67	8.75	7.00	5.83	5.00	4.38	3.89	3.50
\$37.50	12.50	9.37	7.50	6.25	5.36	4.69	4.17	3.75
\$40.00	13.33	10.00	8.00	6.66	5.72	5.00	4.44	4.00
\$42.50	14.17	10.62	8.50	7.08	6.07	5.31	4.72	4.25
\$45.00	15.00	11.25	9.00	7.50	6.43	5.62	5.00	4.50
\$47.50	15.83	11.87	9.50	7.91	6.79	5.93	5.28	4.75
\$50.00	16.67	12.50	10.00	8.33	7.14	6.25	5.56	5.00
\$52.50	17.50	13.12	10.50	8.74	7.50	6.56	5.83	5.25
\$55.00	18.33	13.75	11.00	9.16	7.86	6.88	6.11	5.50
\$57.50	19.17	14.37	11.50	9.58	8.21	7.19	6.39	5.75
\$60.00	20.00	15.00	12.00	10.00	8.57	7.50	6.67	6.00
\$62.50	20.83	15.62	12.50	10.41	8.93	7.81	6.95	6.25
\$65.00	21.67	16.25	13.00	10.83	9.29	8.13	7.23	6.50

The roughages used in dry-lot feeding determine more or less the most desirable type of ration to use. In cases where legume hays are plentiful a dry ration is in more general use, whereas with grass hays, stovers, and straws as the principal source of dry roughage silage usually makes up a very important part of the ration. Dry rations are now usually associated with short feeding periods and with feeder cattle over 800 pounds in weight. Silage rations, on the other hand, are used most in long feeding periods with the lighter weight feeders. (Fig. 4.) There is an increasing tendency among cattle feeders to feed the lower grades of steers a rather heavy silage ration during the winter months and to market in the spring when conditions are best for selling low-grade steers not highly finished.

FEED REQUIRED TO FATTEN STEERS IN DRY LOT

The feed required to produce gains on steers is usually figured in terms of 100 pounds gain. In the Corn Belt many cattle feeders figure it in number of bushels of corn required to fatten the steer. It is difficult to say just how much feed is required for a given quantity of gain, as much depends on the kinds and amounts of feed fed in the ration and the age, weight, and individuality of the steer itself. In areas in which corn is the primary fattening feed the quantity of corn necessary for the development of a 2-year-old feeder into a finished or fat animal is estimated at approximately 50 bushels. Cattle of younger ages may be finished on a somewhat smaller allowance. The fact that young cattle make greater gains than mature ones on the same quantity of feed is generally accepted by all cattle feeders. The average cattle feeder has had more expe-

rience with 2-year-olds and accordingly is more successful with them than with cattle of younger ages, particularly calves.

With a corn-and-alfalfa or clover-hay ration the average cattle feeder obtains a gain of 100 pounds on 3-year-old steers with approximately 950 pounds of corn and 425 pounds of hay. Two-year-olds require from 93 to 95 per cent as much feed as 3-year-olds, yearlings 85 to 90 per cent, and calves 70 to 75 per cent.

STARTING CATTLE ON FEED

There are no definite rules to follow in starting beef cattle on a fattening ration. The most successful practical feeders have worked out systems of their own by careful feeding and close observation

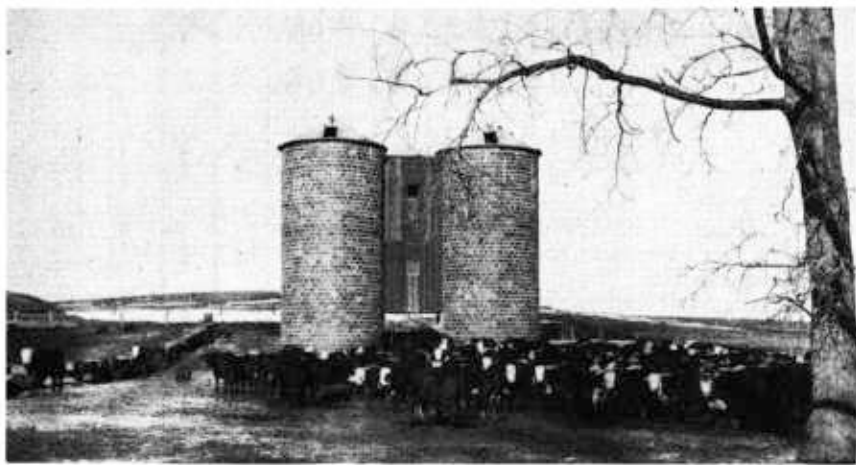


FIG. 4.—Steers fed on heavy silage ration

rather than by following certain feeding standards. An inexperienced feeder, however, may save time by using some recognized feeding standard as a guide.

The first few weeks in the feed lot is a very critical time for the feeder steer. If an animal does not get started off correctly it is almost certain to be an unprofitable animal. Starting the feeder steer on very limited quantities of concentrates and increasing these quantities very gradually during the first 30 days is essential. Roughages of good quality may be fed in any quantity without serious effects. It should be kept in mind, however, that roughages add bulk to the ration, and the greater the use of them in the ration the smaller will be the daily gains and consequently the longer the fattening period.

Table 2 suggests a method of feeding steers of various ages.

TABLE 2.—*Suggested method of increasing feeds in the ration for fattening steers of various weights*

Ration and weight of steers	Daily feed per head for first day and at beginning of stated periods										
	First day	Second week	Third week	Fourth week	Second month	Third month	Fourth month	Fifth month	Sixth month	Seventh month	Eighth month
Corn and legume-hay ration:¹											
400-pound steers—	<i>Lbs.</i>	<i>Lbs.</i>	<i>Lbs.</i>	<i>Lbs.</i>	<i>Lbs.</i>	<i>Lbs.</i>	<i>Lbs.</i>	<i>Lbs.</i>	<i>Lbs.</i>	<i>Lbs.</i>	<i>Lbs.</i>
Corn.....	3	5	7	8	10	12	15	16	16	15	-----
Hay.....	5	6	6	6	6	6	6	6	6	5	-----
600-pound steers—											
Corn.....	4	6	8	10	14	16	20	20	18	-----	-----
Hay.....	6	8	8	7	7	7	7	7	6	-----	-----
800-pound steers—											
Corn.....	5	7	10	13	18	20	22	20	-----	-----	-----
Hay.....	8	10	10	10	10	9	8	8	-----	-----	-----
1,000-pound steers—											
Corn.....	6	8	12	16	20	24	24	-----	-----	-----	-----
Hay.....	10	12	12	10	10	10	8	-----	-----	-----	-----
Silage ration:											
400-pound steers—											
Corn.....	3	4	4	5	7	9	10	11	12	13	14
Protein meal.....	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{4}$	$1\frac{1}{2}$	2	2	$2\frac{1}{2}$	$2\frac{1}{2}$
Hay ²	3	3	3	3	3	3	3	3	3	3	3
Silage.....	6	8	8	8	8	8	7	7	7	6	5
600-pound steers—											
Corn.....	3	4	6	8	10	12	14	14	14	14	-----
Protein meal.....	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$2\frac{3}{4}$	-----
Hay.....	4	4	4	4	4	4	4	4	4	4	-----
Silage.....	8	10	10	10	10	10	10	9	8	6	-----
800-pound steers—											
Corn.....	4	6	8	10	12	16	16	16	16	-----	-----
Protein meal.....	$\frac{1}{2}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{1}{4}$	2	$2\frac{1}{2}$	3	3	-----	-----
Hay.....	4	4	4	4	4	4	4	4	4	-----	-----
Silage.....	10	15	16	16	16	16	14	12	10	-----	-----
1,000-pound steers—											
Corn.....	5	7	8	12	18	18	18	18	-----	-----	-----
Protein meal.....	$\frac{1}{2}$	$1\frac{1}{4}$	2	$2\frac{1}{4}$	$2\frac{1}{2}$	$2\frac{3}{4}$	$2\frac{3}{4}$	$2\frac{1}{2}$	-----	-----	-----
Hay.....	4	5	5	5	5	4	4	4	-----	-----	-----
Silage.....	10	20	20	20	20	18	15	12	-----	-----	-----

¹Legume hay, such as alfalfa, clover, soy bean, or cowpea.²The hay in silage ration may be a mixed hay or any of the grass hays.

It is not intended that the schedules of increases in feeds, as given in Table 2, be followed exactly as given. Some droves of cattle are capable of handling increases more rapidly than others. The schedule is a general guide for feeding the average drove. It should be noted that roughages are fed in greatest amounts during the first part of the feeding period, and concentrates are increased as the period progresses. However, in the case of long feeding periods, there may be a slight reduction in concentrates during the last month.

SUGGESTED RATIONS

The quantities of feed given in the rations listed below represent the total daily feed per head, averaged for the entire feeding period. The feed allowed a steer the last half of the feeding period would be in excess of the average as given, while that for the first half would be somewhat under.

400-POUND STEERS

<i>Dry rations</i>		<i>Succulent rations</i>	
	Pounds		Pounds
Corn	13	Corn	10
Legume hay	6	Protein meal	1¾
		Mixed hay	3
Corn	10	Silage	7
Protein meal	2		
Mixed hay	5	Corn	10
		Protein meal	2
Milo, kafir, or barley (ground) ..	12	Straw or stover	3
Protein meal	1¾	Silage	10
Sorgo fodder	8		
		Milo, kafir, or barley (ground) ..	10
		Protein meal	1¾
		Grass hay	3
		Silage	15

600-POUND STEERS

<i>Dry rations</i>		<i>Succulent rations</i>	
	Pounds		Pounds
Corn	16	Corn	12
Legume hay	7	Protein meal	2
		Mixed hay	4
Corn	14	Silage	9
Protein meal	1½		
Mixed hay	6	Corn	10
		Protein meal	1½
Milo or kafir (ground)	12	Legume hay	5
Protein meal	2½	Silage	20
Cottonseed hulls	10		
		Milo or kafir (ground)	12
		Protein meal	2½
		Sudan hay	4
		Silage	15

800-POUND STEERS

<i>Dry rations</i>		<i>Succulent rations</i>	
	Pounds		Pounds
Corn	18	Corn	14
Legume hay	9	Protein meal	2¾
		Mixed hay	4
Corn	15	Silage	14
Protein meal	2		
Mixed hay	8	Corn	12
		Protein meal	2¾
Milo or kafir (ground)	15	Straw or stover	3
Protein meal	3	Silage	20
Cottonseed hulls	15		
		Milo or kafir heads (ground) ..	15
		Protein meal	2
		Grass hay	3
		Silage	15

1,000-POUND STEERS

<i>Dry rations</i>		<i>Succulent rations</i>	
	Pounds		Pounds
Corn -----	20	Corn -----	18
Legume hay -----	10	Legume hay -----	5
		Silage -----	25
Corn -----	16		
Protein meal -----	2½	Corn -----	16
Mixed hay -----	10	Protein meal -----	2½
		Mixed hay -----	4½
Corn -----	18	Silage -----	17
Protein meal -----	2½		
Straw -----	5	Corn -----	15
Stover -----	5	Protein meal -----	2½
		Straw or stover -----	5
		Silage -----	30

Suitable rations for most feeding areas for the various weights of feeder cattle may be found in the list of suggested rations. Corn may be replaced in any of the rations with barley, milo, or kafir. When these feeds are used in place of corn, they should be ground. If milo or kafir heads are used, one-fifth to one-fourth more weight should be fed, as the heads are from 75 to 80 per cent as valuable as the grain by itself. The legume hay may be alfalfa, clover, cowpea, peanut, or soy bean. Mixed hay is usually considered as clover and timothy. However, any mixture of a legume hay with a grass hay would fall in this class.

Fodder is considered as the whole plant including grain, and stover as the plant without the seed or grain. Sorgo (sweet sorghum) and corn fodders and stovers make up this class of feed largely, and are used only in a limited way in the fattening ration.

Molasses, a by-product of sugar refining, is used considerably in fattening areas. Many Corn Belt cattle feeders use it when it can be supplied at about the same price as corn, pound for pound. However, it is seldom fed in quantities exceeding 3 pounds per head per day. It is useful in improving the palatability of rations which are not particularly relished by cattle. Greater quantities of unpalatable roughages are capable of being used by adding diluted molasses to them.

Commercially mixed feeds are used in considerable quantities by cattle feeders. Generally speaking these feeds are palatable, especially if they contain molasses. Cattle usually make satisfactory gains when the ration contains this class of feed. The alfalfa-molasses feeds are the ones most frequently used among cattle feeders. The alfalfa supplies desirable protein and the molasses increases the palatability in addition to supplying carbohydrates. The principal objection to the use of commercially mixed feeds is their cost. They are usually expensive as compared to feeds grown and mixed on the farm by the cattle feeder himself.

FATTENING ON GRASS

Grass is a most important asset to the cattleman. It is responsible for the bulk of the beef supply; in fact, a large proportion of all cattle slaughtered have received no feed in addition to grass. Even the dry-lot-finished cattle have made their growth and much of their

gain in flesh on grass. Most of the grass cattle come from the ranges of the West and Southwest, although considerable numbers are marketed from the Appalachian region. Thousands of 2 and 3 year old steers are shipped from Texas in the spring to Kansas and Oklahoma, and even farther north, and fattened on grass. The range producers, following this method of finishing the older steers on northern pastures, utilize their Texas grass for the breeding herd and young growing stock.

Grass-fat cattle for slaughter are marketed in great numbers in late summer and early fall. Slaughter-cattle prices are usually lowest during this period of heavy marketing. In cases where there is an abundance of good, relatively cheap pasture, and a scarcity of grain or fattening feeds, grass should be depended on entirely for the finishing of the cattle. Grass-finished cattle do not command the values of grain cattle, yet when grass is plentiful and cheap, one can usually



Fig. 5.—Steers being fattened on grass with a supplement of grain

afford to sell grass-fat cattle at prices somewhat under grain-finished cattle, owing to the much lower cost of production.

Under general farming conditions, where pasture is limited to rough land unsuitable for crop production, it is often advisable to feed a supplement of grain. (Fig. 5.)

SUPPLEMENTARY FEEDS FOR STEERS ON GRASS

The addition of a supplement of grain to grass favors earlier marketing of the cattle, thus avoiding the heaviest competition of strictly grass-fed cattle. Grain-grass-finished cattle generally bring prices that will more than justify the expense of the grain.

Corn is the most extensively used supplement. In some sections cottonseed cake or meal is used in connection with fattening on grass. In the Corn Belt and other northern areas, corn and cottonseed cake are frequently fed in combination as a supplement. Corn is usually fed in the shelled form. However, some feeders prefer

ground or cracked shelled corn, or corn-and-cob meal. The experimental work done on supplementary feeds is insufficient to justify a statement as to what form of supplement is most satisfactory.

The question which arises in feeding supplements on grass is whether to feed the supplement throughout the grazing season or only during the latter part. The method to use should depend somewhat on how the cattle were handled during the previous winter and the quality and quantity of the pasture available.

If the cattle were well wintered and received considerable grain, it is perhaps desirable to feed grain from the beginning of the grazing period. On the other hand, if they were roughed through the winter on silage, dry roughages, and a little meal or cake, it may be just as satisfactory to feed the supplement only during the last 90 to 120 days of the grazing season. If there is an abundance of grass of good quality and the cattle did not have any appreciable amount of grain during the winter and spring, it is not necessary, as a rule, to feed the supplement during the first part of the grazing period.

Steers 2 years of age or older are preferred for fattening on grass, primarily because more finish can be put on them in a short period of time, as compared to younger cattle.

Cattle used for grass-grain fattening are usually purchased in the fall and roughed through the winter in order to gain from 50 to 75 pounds during the winter period. Cattle so handled generally make greater gains on grass the following summer than cattle making larger winter gains. When cattle are finished on grass with supplementary feeds, it is usually more satisfactory to rough them through the winter on a ration of silage, straw, and cottonseed or linseed meal, or on a hay and straw or stover ration with some protein meal in the absence of a legume hay, and save the grain for summer feeding on grass.

FEEDING SUPPLEMENTS TO SUCKLING CALVES

When beef cattle are raised under intensified farming conditions and pasture is rather limited, the practice of feeding a grain mixture to calves while they are still running with their dams on pasture is meeting with considerable favor. The finishing of calves by this system means a quick turnover, and is to be recommended where grade herds are maintained for beef production in the farming areas.

If spring calves are fed a supplement of grain on grass while they are nursing their dams they can be marketed in the fall when weaned at an average weight of about 500 pounds. Beef calves, 6 to 8 months old, of good quality and finish, are usually in good demand and generally bring greater net returns than if carried over another year or two.

Calves fed a grain supplement on grass while nursing are usually either allowed to run with their dams and to have access to grain in a self-feeder placed within a creep, or they are allowed a separate pasture with access to grain and are permitted to nurse two or three times a day. Owing to the greater degree of labor involved, the method of using separate pastures for cows and calves is not so popular as that of allowing calves to run with their dams.

Rations suitable for fattening cattle on grass are given in table 3.

TABLE 3.—Average rations for fattening cattle on grass

Class of cattle	Average weight	Grain	Protein supplement	Days on concentrates	Days on pasture
	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>		
2-year-old steers.....	850	8.0	1.0	120	120
		12.0	0	60	120
Yearling steers.....	650	5.5	1.5	140	140
		6.5	1.0	84	140
Creep-fed calves.....		4.0	1.0	160	160

Corn is usually the most popular grain for cattle feeding. It may be replaced entirely by ground barley or, in part, by any cereal grain. Cottonseed meal is the most widely used protein supplement for cattle. Some persons prefer linseed meal for calves, but any of the protein-rich feeds should be satisfactory.

MINERALS FOR FATTENING CATTLE

Salt should be kept before cattle at all times. Compressed block and loose granulated salt are more satisfactory forms than rock salt as it comes from the mine. When fattening cattle are supplied with a variety of feeds, including legumes, they usually get enough minerals, with the exception of salt. In the absence of legumes the fattening ration may be deficient in calcium, which element contributes much to the skeletal development. This is of more importance in rations for young animals. Calcium may be supplied in many forms, such as pulverized limestone, oystershell, or calcium carbonate. The feeding of 1 ounce of calcium in the daily ration in any of these forms should make up any calcium deficiency due to the absence of legumes.

Fattening cattle should consume from $\frac{1}{2}$ to $1\frac{1}{2}$ ounces of salt per head daily, depending on the kinds of feeds used in the fattening ration and the age of the cattle.

It is a mistake to withhold salt from cattle toward the close of the feeding period and salt heavily just before shipping. Such a practice may cause the cattle to drink more water at the market than they otherwise would, but there is no advantage in getting a large fill on the cattle, as shrewd buyers are able to estimate very closely the amount of fill.

VITAMINS FOR FATTENING CATTLE

Like minerals, vitamins are perhaps of greater concern in rations for growing and breeding cattle than for fattening cattle. However, in steer-fattening areas where green leafy forage and yellow grain are limited, as in the cotton- and kafir-production areas, rations are likely to be deficient in vitamin A. This deficiency is usually detected by night blindness and swelling of the joints and by convulsions in the advanced stages. Vitamin A-deficient rations can usually be corrected by including a few pounds of green leafy hay or small quantities of fish oil.

FEED-LOT EQUIPMENT¹

Expensive barns devoted exclusively to cattle feeding are unnecessary. A barn and shed combined such as is shown in Figure 6 is very



FIG. 6.—A desirable type of barn and shed combined

satisfactory in the coldest cattle-feeding localities. The dry-roughage supply and other stock may be taken care of in a barn of this type. The fattening cattle occupy only the open side, with southern expo-

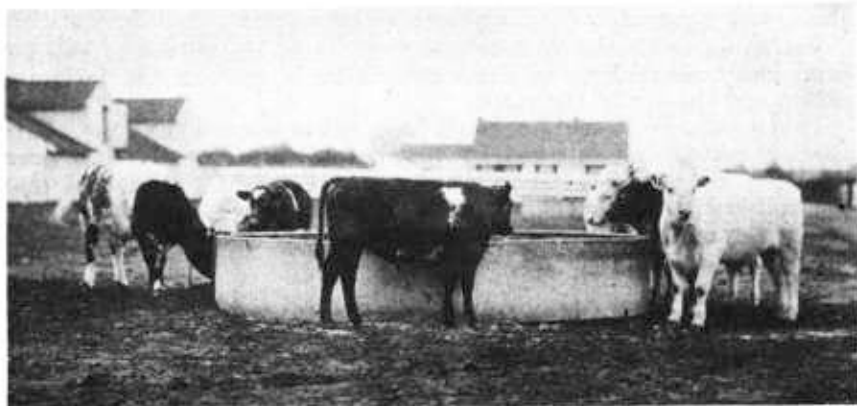


FIG. 7.—Cattle should have an adequate supply of pure water in the feed lot

sure. Provision is made for feeding the dry roughage inside the shed. In the cattle-feeding areas having more moderate climates, a shed providing shelter from cold rains is all that is necessary.

¹ Farmers' Bulletin 1584, Feed-lot and Ranch Equipment for Beef Cattle, illustrates and discusses in detail various kinds of feed-lot equipment.

No shed, barn, or other shelter is complete without bedding. Cattle should always have access to a dry, well-bedded place in which to lie down. This can more easily be provided if the feeding is done in the open, away from the shelter. Bedding usually pays for itself through a greater saving of manure and by the appearance of the cattle at time of sale. Cattle that are clean invariably sell higher, as they are bought for meat and not for mud or manure.

Most cattle are what may be termed "hand-fed." Self-feeders have been used mostly with young, growing stock, but their use is increasing somewhat in the fattening of cattle for market. The early part of the feeding period is perhaps the most critical time in the fattening process. It is essential that the animal be started very gradually on the fattening feeds, and this can be controlled to better advantage if it is fed two or three times a day rather than if access is given to an unlimited supply of feed in a self-feeder. However, after cattle get on full feed, very little difficulty should be experienced with the self-feeder.

Watering troughs should be conveniently located. When two feed lots are used, the same trough should serve both.

It is advisable to have an abundant supply of fresh water available at all times. (Fig. 7.) Fattening cattle consume from 5 to 10 gallons of water a head daily. For 2-year-old steers provision should be made to have at least 10 gallons available per head per day. Cattle will not consume water enough in winter if compelled to drink it ice cold. Some suitable heating device should be installed in cold climates to keep the water above the freezing point.

A chute for holding cattle is a necessary piece of equipment. (Fig. 8.) It may be used for dehorning, castrating, branding, and for administering other treatments.

Horns and choice beef carcasses as a rule do not go together. Feeders having horns do not feed out so well as dehorned cattle. Badly bruised carcasses are usually found in shipments of horned cattle. Bruises detract greatly from the appearance of the carcasses,

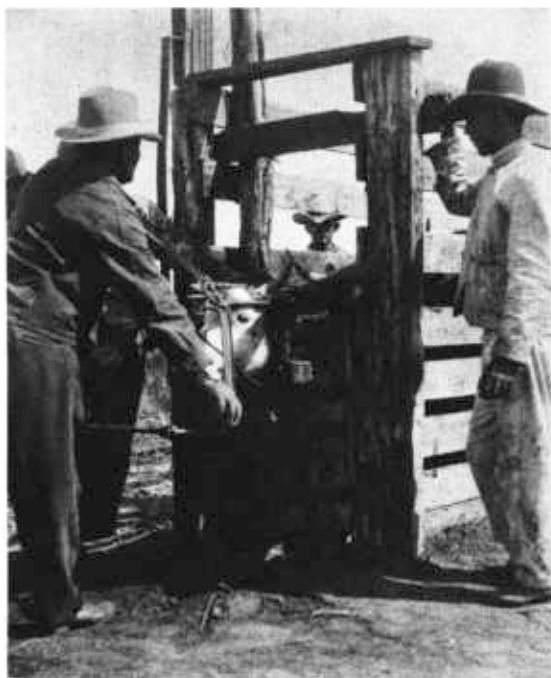


FIG. 8.—Dehorning is a simple process if the animal's head is held firmly in a suitable chute

thus lowering their sale value considerably. Aside from the damage done to meat, the hide is frequently damaged as a result of cattle goring one another. Dehorned cattle usually bring from 25 to 75 cents

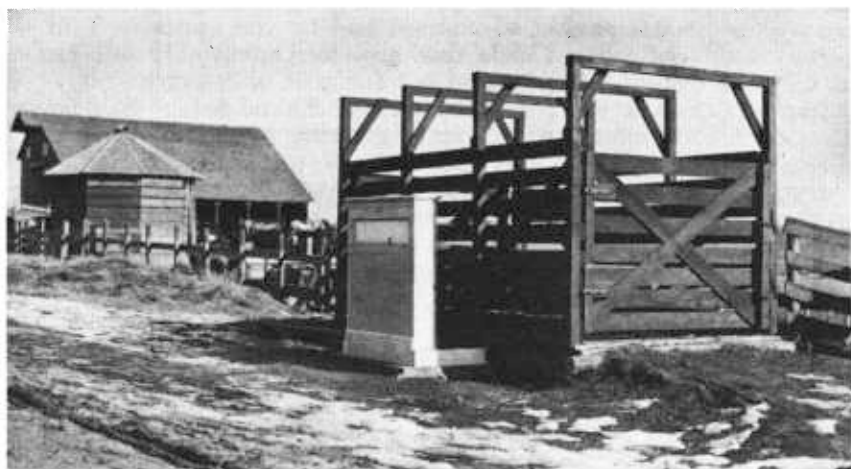


FIG. 9.—The common type of scales with stationary rack for holding cattle while weighing

a hundredweight more than horned cattle of similar quality and condition.

Scales are a valuable piece of feed-lot equipment. It is important in cattle feeding to know just how the animals are doing from time



FIG. 10.—Hogs in the feed lot with cattle usually contribute to the net income

to time. Some of the most successful feeders weigh the cattle every month. The scales should be installed close to the feed lot (fig. 9) and located so that they may be used for weighing other stock and farm products.

Hogs also may be considered as feed-lot equipment for no feed lot is complete without them. (Fig. 10.) They are most needed where large quantities of grain are used in the ration. The pork gains are greatest when the whole grains rather than ground feeds are used, as digestion by cattle is usually more complete with ground feed. It is usually more profitable in cattle feeding to feed unground corn and have a sufficient number of hogs following the cattle to utilize any undigested feed passing through the cattle. Such feeds as milo, kafir, and barley should be ground, however.

It is not uncommon to find that the profit in feeding cattle is due to gains on the hogs following the cattle. Most cattle feeders take it as a matter of course that cattle feeding can not be made a successful enterprise without having hogs in the feed lot with the cattle. It is well to have at least one good, thrifty shote to every two steers.